

ARCHAEOLOGICAL INVESTIGATIONS AT THE PULEMELEI MOUND, SAVAI'I, SAMOA

*Helene Martinsson-Wallin, Geoffrey Clark and Paul Wallin
Kon-Tiki Museum and Australian National University*

BACKGROUND

Archaeological investigations began in Samoa in 1957 when Jack Golson excavated some settlements and mounds on 'Upolu (Green and Davidson 1969:3). In the 1960s, Roger Green initiated an archaeological investigation program on Western Samoa (Green and Davidson 1969, 1974, Green 2002:125-152). These projects were followed by a research program inaugurated by Jesse D. Jennings (and others) from 1974 to 1977 (Jennings et al. 1976, Jennings and Holmer 1980, Jennings et al. 1982).

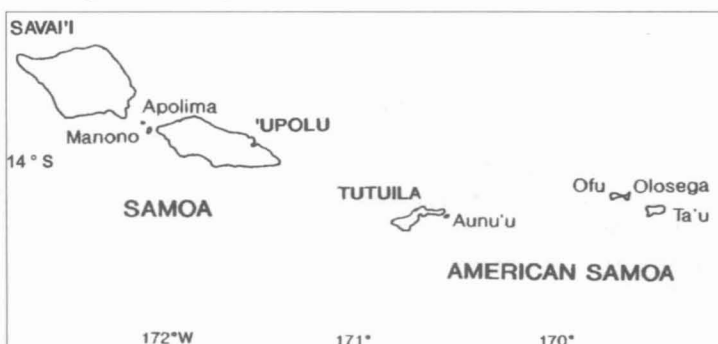


Figure 1. Map of the Samoan Islands.

The research projects mainly concentrated their efforts on the island of 'Upolu, plus some limited research on Savai'i, and the islets of Manono and Apolima. The first Lapita site was found underwater on the northwest coast at Mulifanua (dated to ca 800 BC), with mounds and settlements excavated at other locations. No prehistoric sites on Savai'i were excavated, but some were surveyed and mapped, such as in the Letolo area (Jennings et al. 1982:87-92).

The Letolo survey was in the Letolo plantation on the southeast of Savai'i. Some 3000 features were recorded, including monumental platforms, mounds, earth ovens, walls and walkways, which were surveyed by G. Jackmond from the Peace Corps in the early 1970s. A small-scale map of the extensive survey was published by Jennings et al. (1982:88). A central point at the Letolo site is the enormous stepped platform called Pulemelei (also known as Tia Seu), which is thought to be the largest prehistoric stone structure in Polynesia. Green, Davidson and Scott visited the site in 1967 and a map of the mound was made (Scott 1969:80).

Archaeological knowledge of Samoa has centered largely on 'Upolu and the smaller islands of American Samoa. Relatively little is known about Savai'i although in land area it is the largest in the archipelago (1,820 km²) and according to traditional information it was an important political center in late prehistory.

The islands of the Samoan group (Figure 1) were formed by volcanic activity and are essentially mountains and ridges of erupted rock sitting on the Pacific Plate. Eruptions have been ongoing and the south and north coast of Savai'i are now covered by lava, which probably destroyed or made many archaeological sites inaccessible. The rapid rate of island subsidence calculated by Dickinson and Green (1998) at 1.4 mm/year suggests that the oldest sites in Samoa might well be 4 m below their original position relative to sea level.

In recent years most of the archaeological activities have concentrated on American Samoa (Hunt and Kirch 1988, Kirch and Hunt 1993, Clark and Herdrich 1993, Clark and Michlovic 1996, Clark et al. 1997, Ayres et al. 2001, Suafo'a 2001, Taomia 2001). Previous and current research on Fiji-Tonga-American Samoa has broadened the knowledge of the prehistory of the central Pacific but Savai'i, as it was 20 years ago, is very much an archaeological "no man's land" (see a recent summary on Samoan archaeology by Green 2002:125-152.)

EXCAVATIONS AT PULEMELEI MOUND

The aim of renewed work at Pulemelei in 2002 was to improve the archaeological understanding of prehistoric development on Savai'i by investigating the origins and development of monumental architecture. The Pulemelei mound and surrounding structures appear not to have been recorded in traditional history, but archaeological investigations of mounds on 'Upolu and American Samoa suggest construction and use of mounds during the period AD 1000 to AD 1600 (Jennings and Holmer 1980:5-10, Kirch 2000:219-229). Very little is known of the temporal context and function of field monuments (Herdrich 1991:381-434), and investigations should provide new knowledge about these important archaeological sites and the development of complex societies in central Pacific.

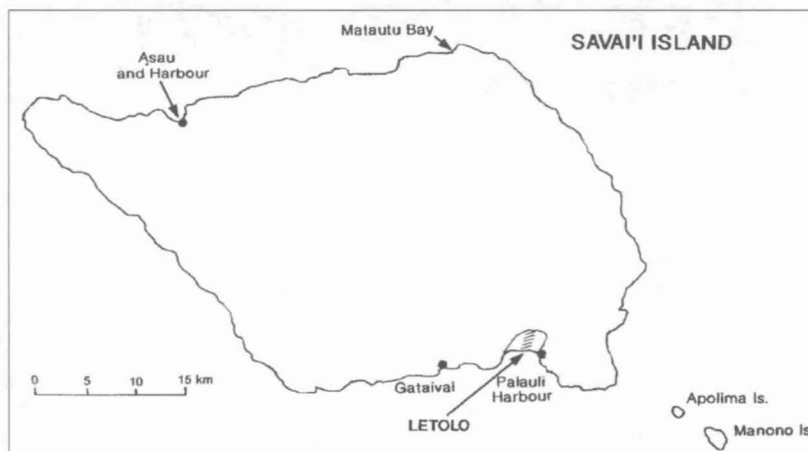


Figure 2. Map of Savai'i (investigation area at Letolo plantation indicated).

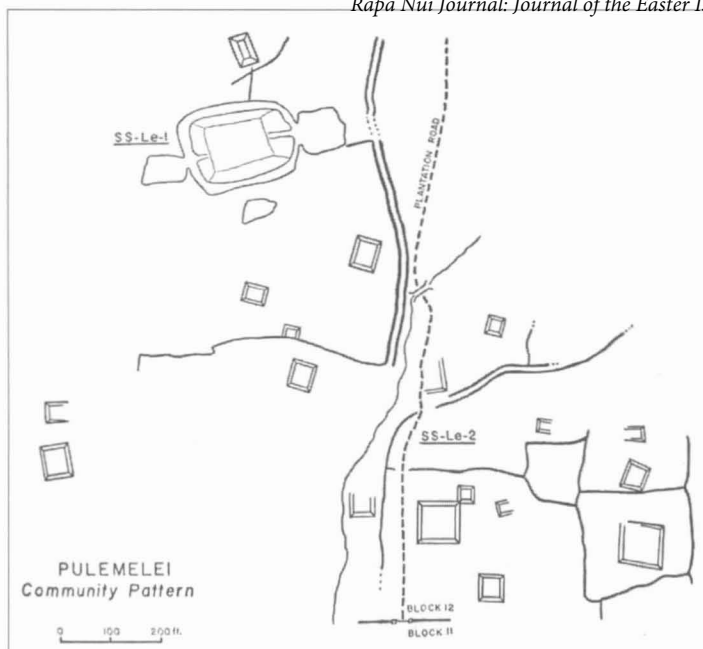


Figure 3. Map of Pulemelei and surrounding structures (from Scott 1969, Figure 42).

The archaeological investigation at Pulemelei mound on the Letolo plantation on Savai'i (Figures 2 and 3) is a collaborative project between the landowners of the Nelson Plantation Inc, the Kon-Tiki Museum, Oslo, Norway (Drs. Martinsson-Wallin and Wallin), the Australian National University, Canberra, Australia (Dr. Clark), and The National University of Samoa (Dr. Asofou So'o). Work at Pulemelei took place between the 13th September and 11th October 2002. Archaeologists in the field were Drs. Wallin and Clark plus twenty men from the nearby Vailoa village who were employed as field assistants, aided by the foreman of the Letolo plantation, Mr.



Figure 4. Pulemelei mound after clearing in September 2002.

Aiolupo. The purpose of the preliminary work was to expose the mound so that a new map could be made in order to assess the degree of structural degeneration in the 37 years since it was last mapped, and to allow detailed description of the mound. Test excavations were planned to obtain samples for radiocarbon dating and to examine the construction sequence.

After the mound was cleared it was measured and found to have base dimensions of ca 65 m x 60 m with a maximum height above the ground surface of about 12 m on the south edge and 7 m along the north edge (Figure 4). It was con-

structed with a base platform and three platforms on top of each other. The base platform of volcanic stones was about 0.6 m high and it appears to be built on vertically placed foundation stones with earth fill behind the foundation stones. On top of the foundation stones was a base platform made of volcanic stone around 2 to 3 m high (the height varies on the south and north edge) with vertical or slightly sloping sidewalls. On top of this was a platform made of volcanic stone around 3 to 6 m high (the height varies on the south and north edge) with sloping sidewalls. The top platform was 1.1 m high and had vertical sides and was also made from volcanic stones with maximum dimensions of 44 m by 34 m. The top platform surface was level and paved with rounded stream stones about 5 to 15 cm in greatest length. More than 40 stone cairns were found distributed on the top platform. These cairns may be of a very recent origin since there are only 10 recorded in Scott's 1965 map (1969:80) and local informants reported that stone piles were built when the mound was cleared of vegetation.

TEST EXCAVATION AND RESULTS

Nine test-pits (TP 1-9, 1 m x 1 m) were placed on the ground around the sides of the structure with a larger test trench (Trench 1, 2 m x 4 m) on the south edge. The test trench was placed where an intact part of the base platform had survived collapse because it was protected by a stone ramp, which in turn buttressed the base platform on either side of the ramp. A preliminary investigation of the structure of the top platform was made when the removal of roots from a large tree exposed the sub-face material to a depth of 80 cm.

The excavations recovered charcoal from all pits and the trench. Fragments and dispersed charcoal were frequently found at of about 20 cm to 40 cm below the ground surface (Figure 5b). It is possible that the charcoal represents initial clearing and burning during the building phase or post-construction vegetation clearance. In one of the test pits (TP 1)

as well as in the larger trench (Trench 1), we found prehistoric earth ovens (*umu*) at the same depth as the scattered charcoal and Test Pit 3 also contained a charcoal concentration (Figure 5a). The ovens contained charcoal and fire-cracked volcanic stones, but no other faunal nor artifactual finds were observed. The ovens are clearly the result of activity carried out in close proximity to the structure, perhaps during the initial construction phase, but the origin of the scattered charcoal is less certain. In addition a

charcoal concentration from the hole excavated to remove tree roots on the top platform allowed us to date use of the top platform and to compare the result with dates for oven use and other charcoal producing events near the base of the Pulemelei mound.

Another important find was two ceramic sherds from TP 3 and TP 5, both on the west side of the structure. These are the first ceramic sherds found on Savai'i apart from recent discovery of pottery at *Siutu* village by Japanese archaeologists (Ishimura personal communication) The sherd from TP 3 was

Figure 6. Table of dated radiocarbon samples

Lab no	Location	Depth, provenance	Material	13C/12C Ratio	Conventional Radiocarbon age BP	Calibrated AD 2 sigma
Beta-172927	Test pit 3	40 cm, charcoal concentration	Charcoal	-27.5 o/oo	850±50	1040-1270
Beta-172928	Trench 1	40 cm, from earth oven	Charcoal	-26.1 o/oo	1250±100	620-1000
Beta-177607	Test pit 6	10-20 cm, scattered charcoal	Charcoal	-26.6 o/oo	660±80	1230-1420
ANU-11890	Top platform	60 cm, under flat stone below tree root	Charcoal	-24.0±2.0	310±90	1420-1690
ANU-11891	Test pit 1	40 cm, from earth oven	Charcoal	-24.0±2.0	780±120	1020-1400

found at ca 40 cm depth in a yellow-brown fine silty-clay beside a small charcoal concentration. The other sherd was found on the top of the TP 5 spoil heap. Since it was found on the top of the pile, it probably came from the bottom of the excavation (ca 50-60 cm depth).

The *umu* charcoal in TP 1 has a conventional radiocarbon age of 780 ± 120 BP (ANU-11891) and a calibrated 2 sigma range of AD 1020 to AD 1400. A sample from the charcoal concentration in TP 3 has an age of 850 ± 50 BP (Beta-172927) and has a calibrated range of AD 1040 to AD 1270. These determinations may provide an age for the initial construction phase of Pulemelei. Scattered charcoal from a depth of 10 cm to 20 cm in TP 6 has an age of 680 ± 80 BP (Beta-177607) and has a calibrated range of AD 1230 to AD 1420. This might indicate activities tied to the use of the site and possible later clearing and building activities. The charcoal sample from the tree root excavation on the top platform has a conventional radiocarbon age to 310 ± 90 BP (ANU-11890) and has the most recent calibrated age of AD 1420 to AD 1690. This indicates that the top platform is a late addition. However, the presence of the ceramic sherds, which are generally thought to date about 1700 to 1400 cal. BP in Samoa, and an earlier date on an *umu* in Trench 1 (see below) could indicate activities which pre-date the monumental construction or even an earlier age for initial construction of the main mound.

Trench 1 was perpendicular to an intact part of the original base platform wall. A section of the original base wall was uncovered by removing several layers of stone rubble. At a depth of about 60 cm, the foundation

stones of the structure were exposed. The foundation consisted of vertical standing stone slabs with three standing side by side uncovered in Trench 1. It appeared that behind these foundation stones was a deposit of earth fill. An *umu* was found about 2 m distant of, and at the same level as the bottom of the foundations stones. A charcoal sample from the *umu* has an age to 1250 ± 100 BP (Beta-172928) and has a calibrated age earlier than other determinations of AD 620 to AD 1000.

In conclusion, Pulemelei was constructed in the following way: At the bottom it appears to have an earth-filled foundation platform retained by vertical slabs on edge, and on top of this is a base platform constructed of local volcanic boulders. Above this is a slanting platform area, which leads up to a vertical-sided top platform built of horizontal slabs and paved with rounded stream stones. The structure is built on ground that slopes downhill from north to south, which means that the highest point of the structure on the south is about 11m to 12 m. The radiocarbon dates are the first for Savai'i and suggest that activities in the vicinity of the mound span AD 620 to AD 1690 (Figure 6), although the presence of a few ceramic sherds might indicate human use before AD 600. The dates on the two *umu* are different and do not overlap each other but follow in sequence suggesting ongoing use of the area. The oven closest to the mound in Trench 1 has an earlier age (AD 620 to AD 1000) than the sample from the *umu* in TP 1 (AD 1020 to AD 1400). The date of the charcoal concentration in TP 3 (AD 1040 to AD 1270) is similar to the TP 1 oven. The date of the scattered charcoal found at 10-20 cm in TP 6 (AD 1230 to AD 1420) indicates the ongoing use of the site.

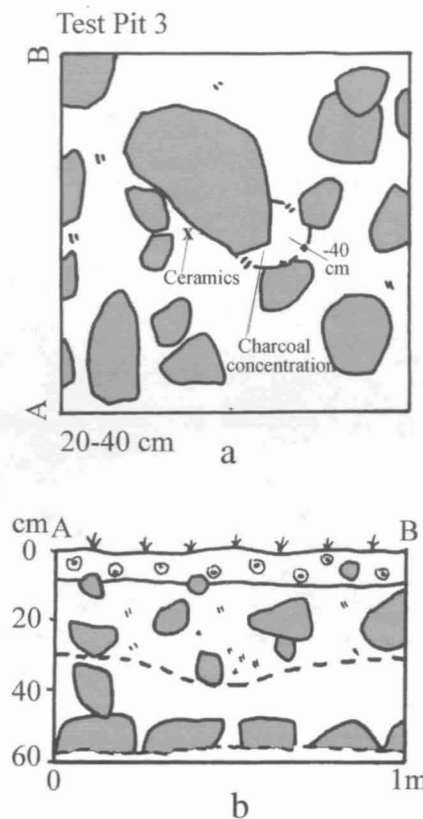


Figure 5. Plan drawing (a) and section (b) of test pit 3.

The late age for the single sample we have from the top platform suggests it might be a later addition to the mound. The evidence from the dated samples and the finds of ceramics suggest that this area has been utilized by Samoans for at least the last 1500 years.

Further investigation and dating needs to be conducted before more secure conclusions can be reached. The preliminary work shows that large structures like Pulemelei are complex constructions that may have been built over quite long intervals and as a result they are likely to have had multiple functions. In 2003 we will be returning to Pulemelei to carry out more extensive investigations of the main mound and also of surrounding structures to examine questions of chronology and function raised by our initial research.

ACKNOWLEDGMENTS

Our thanks goes to our Samoan collaborators; the landowners of Nelson Inc., Mr. Tamasese, Mr. Moore, Mr. Retslaff and Mr. Joe Annandale, who is the Samoan coordinator of the project. We would also like to thank Dr. Asofou So'o for his good collaboration and for inviting us to participate with a paper on Samoa archaeology at the conference "Identifying Future Research Directions in Samoan Studies" at the National University of Samoa on the 9th to 11th of September 2002. Special thanks goes to our workers in field, the foreman of the Nelson Plantation Mr Aiolupo and the foreman of our field workers Mr Ageli as well as our hard working friends; Tunoa Mataafa, Feusio Simaka, Tuuanu Savar, Apelila Saer, Vavao Malu, Taitai Fono, Tuivale Mataaea, Kilisi Akekipa, Asiasiga, Siaki, Fito Farení, Kalepo, Alatina, Sefo, Tuugasala, Lepa Lui, Simi, Avia, and Iakaopo.

REFERENCES

- Ayres, W. S., J. A. Wozniak, G. Robbins and E. Suafo'a 2001. Archaeology in American Samoa: Māloatā, Malaeimi and Malaeloa. *Pacific 2000. Proceedings of the Fifth International Conference on Easter Island and the Pacific*. C. S. Stevenson, G. Lee and F. J. Morin eds. :227-235. Los Osos: Easter Island Foundation.
- Clark, J. T., 1996. Samoan Prehistory in Review. Oceanic Culture History: Essays in Honor of Roger Green. Special Publication. J. M. Davidson, G. Irwin, B. F. Leach, A. Pawley and D. Brown eds. :445-60. Dunedin: New Zealand Archaeological Association.
- Clark, J. T. and D. J. Herdrich 1993. Prehistoric Settlement Systems in Eastern Tutuila. *Journal of the Polynesian Society* 102:147-85.
- Clark, J. T. and M. G. Michlovic 1996. An Early Settlement in the Polynesian Homeland: Excavations at 'Aoa Valley, Tutuila Island, American Samoa. *Journal of Field Archaeology* 23:151-67.
- Clark, J. T., P. Sheppard and M. Jones 1997. Late Ceramics in Samoa. A Test Using Hydration-rim Measurements. *Current Anthropology* 38:898-904.
- Dickinson, W. R. and R. C. Green 1998. Geoarchaeological Context of Holocene Subsidence at the Ferry Berth Site. Mulifanua, Upolu, Western Samoa, *Geoarchaeology* 13:239-263.
- Green R. C. 2002. A Retrospective View of Settlement Pattern Studies in Samoa. *Pacific Landscapes. Archaeological Approaches*. T. N. Lidefeged and M. W. Graves eds. :125-152. Los Osos: Easter Island Foundation.
- Green R. C., and J. M. Davidson, eds. 1969. *Archaeology in Western Samoa*. Volume I, Bulletin 6. Auckland: Auckland Institute and Museum.
- Green R. C., and J. M. Davidson, eds. 1974. *Archaeology in Western Samoa*. Volume II, Bulletin 7. Auckland: Auckland Institute and Museum.
- Herdrich, D. J. 1991. Towards an Understanding of Samoan Star mounds. *Journal of the Polynesian Society* 100:381-435.
- Hunt, T. L. and P. V. Kirch 1988. An Archaeological Survey of the Manu'a Islands, American Samoa. *Journal of the Polynesian Society* 97:153-83.
- Jennings, J. D. and R. N. Holmer 1980. *Archaeological Investigations in Western Samoa*. Pacific Anthropological Records 32. Honolulu: Department of Anthropology, Bernice P. Bishop Museum.
- Jennings, J. D., R. N. Holmer and G. Jackmond 1982. Samoan Village Patterns: Four Examples. *Journal of the Polynesian Society* 91:81-102.
- Jennings, J. D., R. N. Holmer, J. C. Janetski and H. L. Smith 1976. *Excavations on Upolu, Western Samoa*. Pacific Anthropological Records 25. Honolulu: Department of Anthropology, Bernice P. Bishop Museum.
- Kirch, P. V. 2000. *On the Road of the Winds*. Berkeley: University of California Press.
- Kirch, P. V., and T. L. Hunt, eds. 1993 *The To'aga Site: Three Millennia of Polynesian Occupation in the Manu'a Islands, American Samoa*. Contributions 51. Berkeley: Archaeological Research Facility, University of California.
- Scott, S. D. 1969. Reconnaissance and Some Detailed Site plans of Major Monuments of Savai'i. *Archaeology in Western Samoa*. Volume I, Bulletin 6. R. C. Green and J. M. Davidson eds. :69-90. Auckland: Auckland Institute and Museum
- Suafo'a, E. 2001. History in the National Park of American Samoa: Field Methods and Archaeological Approaches. *Pacific 2000. Proceedings of the Fifth International Conference on Easter Island and the Pacific*. C. S. Stevenson, G. Lee and F. J. Morin eds. :205-212. Los Osos: Easter Island Foundation.
- Taomia, J. M. E. 2001. Archaeological Survey on the Tafuna Plain and Adjacent Areas, Tutuila Island. American Samoa. *Pacific 2000. Proceedings of the Fifth International Conference on Easter Island and the Pacific*. C. S. Stevenson, G. Lee and F. J. Morin eds. :213-217. Los Osos: Easter Island Foundation.